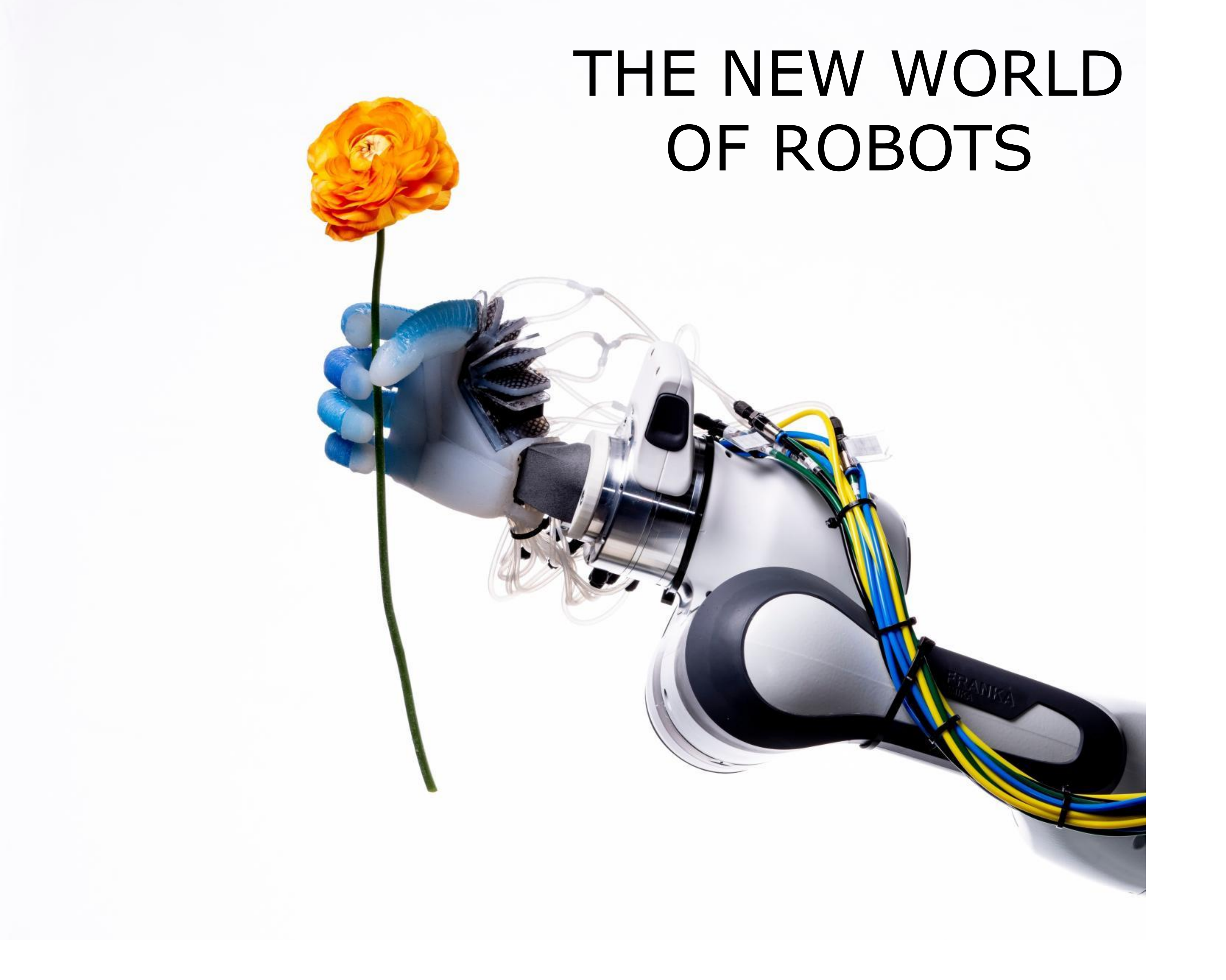
THE NEW WORLD OF ROBOTS



COMPILED BY HOWIE BAUM

What do you think of when you hear the word "robot"?









ROBOTICS TERMINOLOGY

➢**Robot** – A mechanical device that performs human tasks, either automatically or by remote control.

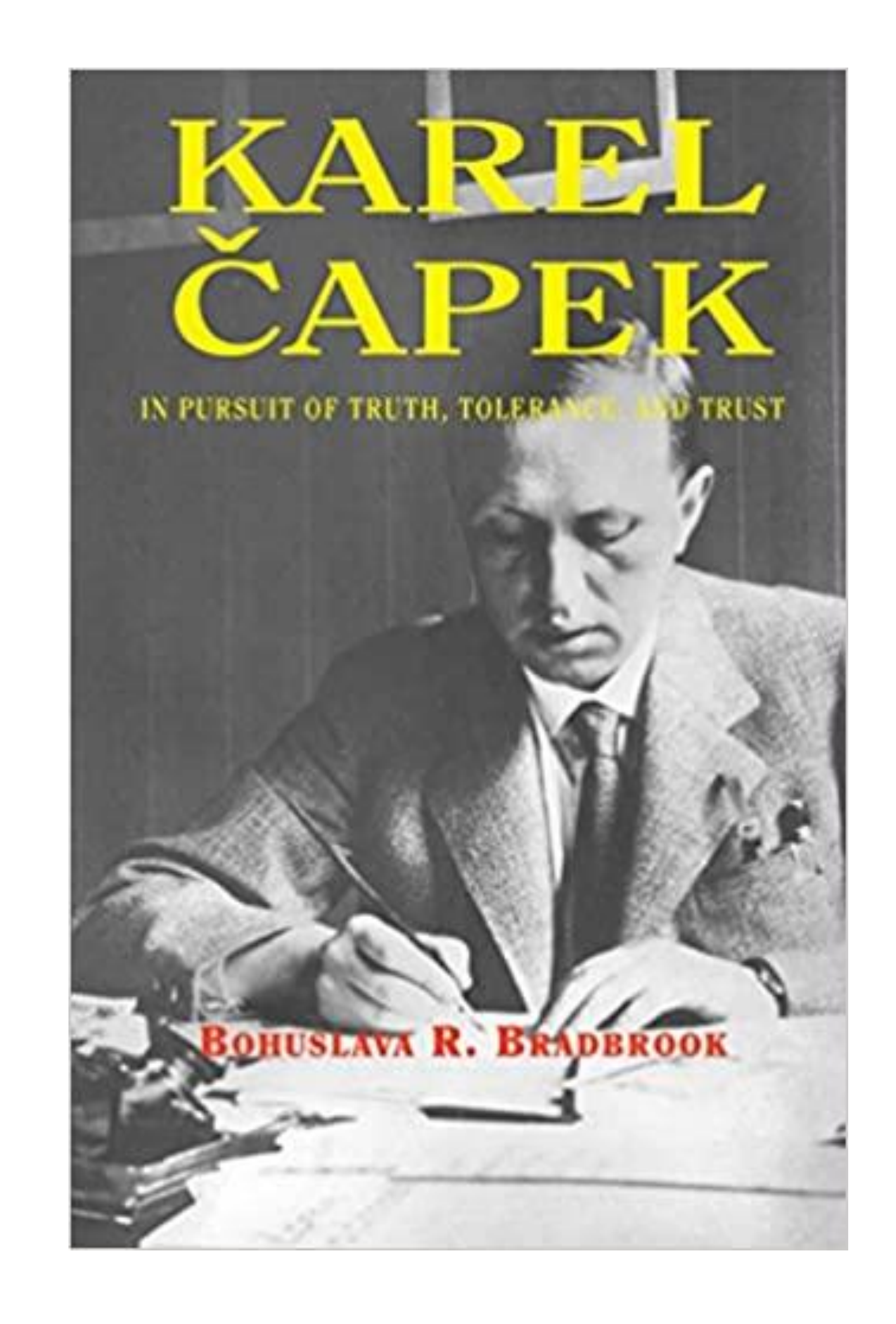
➢**Robotics** – The study and application of robot technology.

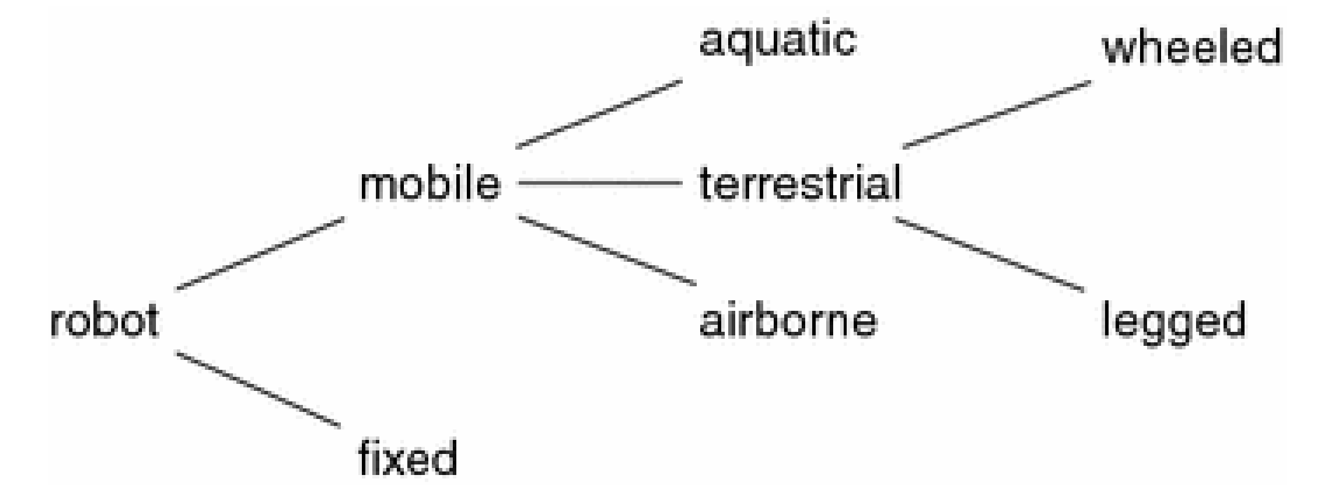
➢**Tele-robotics** – A robot that is operated remotely.

- The term “robot" was first used in 1920 in a play called "R.U.R." Or "Rossum's universal robots" by the Czech writer Karel Capek.

- **Last year was 100 years since the word was created !!**

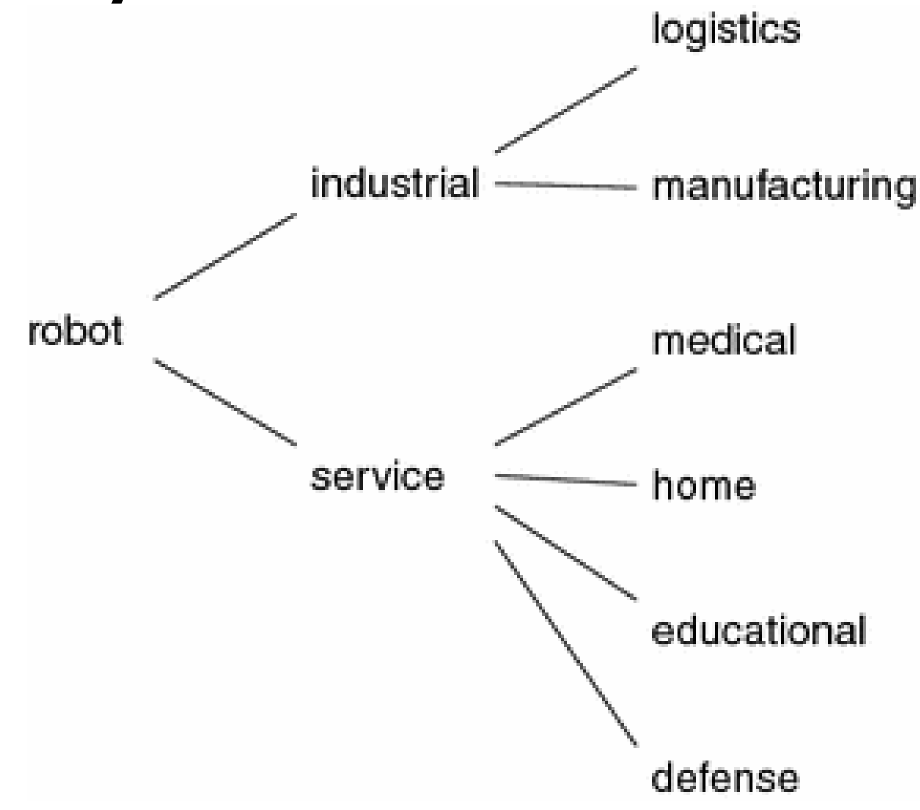
- The acclaimed Czech playwright (1890-1938) made the first use of the word from the Czech word “Robota” for forced labor or serf.





Classification of robots by their environment and if or how they move

Classification of robots based on where they are used



WHAT ARE THE 16 TYPES OF ROBOTS ?

1) Aerospace
2) Consumer
3) Disaster Response
4) Drones
5) Educational
6) Entertainment
7) Exoskeletons
8) Food preparation
9) Humanoids
10) Industrial
11) Medical and Rehab
12) Military and Security
13) Research
14) Self-Driving cars
15) Telepresence
16) Underwater

1) AEROSPACE

This is a broad category.

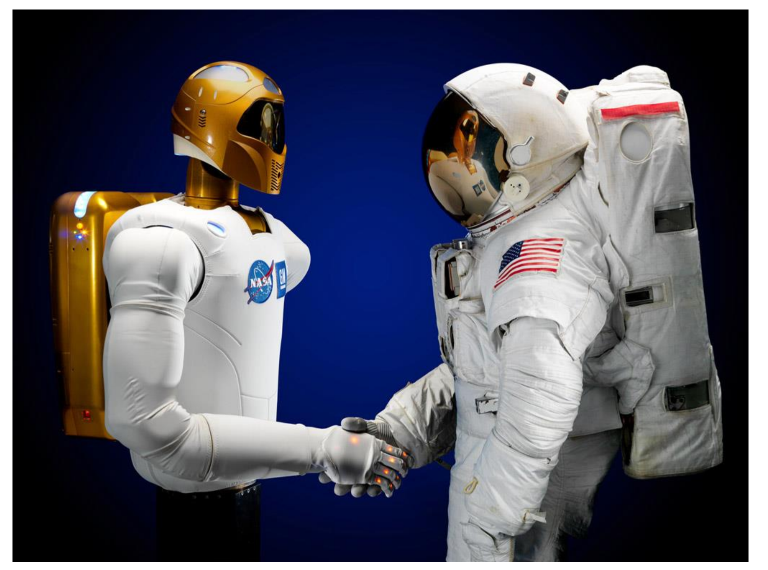
It includes all sorts of flying robots—the SmartBird robotic seagull



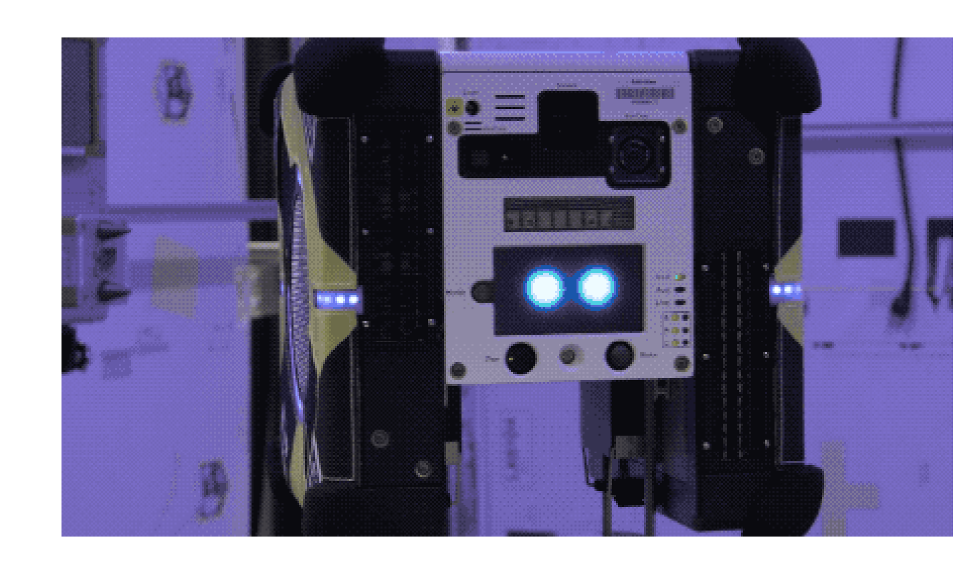
The Raven surveillance drone.



Robots that can operate in space, such as the **Mars rovers** and **NASA's Robonau**t, the humanoid that flew to the International Space Station and is now back on Earth.

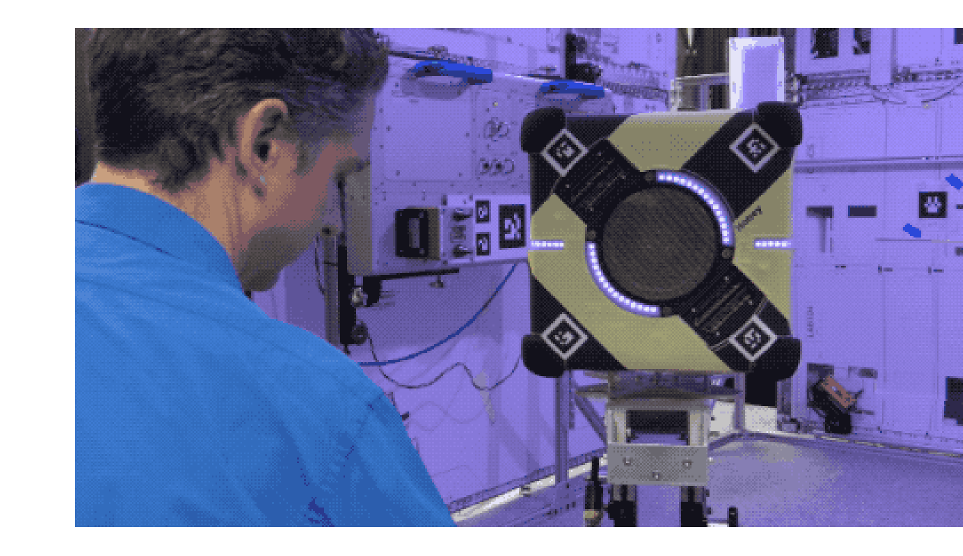


ROBOTIC “BEES” ARE ABOUT TO JOIN ASTRONAUTS IN SPACE



To free up valuable time for astronauts living and working aboard the International Space Station, we’re sending three robotic helpers to the orbiting outpost.

The cube-shaped Astrobee robots will each stay as busy as a bee flying around the space station and assisting crew with routine tasks like maintenance and tracking inventory.



.

2) CONSUMER USES

Consumer robots are robots you can buy and use just for fun or to help you with tasks and chores.

Examples are the robot dog Aibo (at a whopping $2,900.00 !)

The Roomba vacuum, AI-powered robot assistants, and a growing variety of robotic toys such as Furbys and kits.











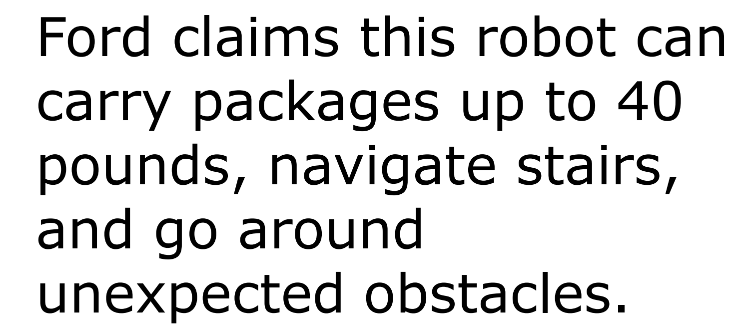
The Roomba domestic vacuum cleaner was the first successful domestic robot.

Domestic robots are simple robots dedicated to a single task work in home use.   They are used in simple but unwanted jobs, such as vacuum cleaning, floor washing, and lawn mowing.

DIGIT, THE 2-LEGGED ROBOT



Ford partnered with Agility Robotics to create Digit, a two-legged robot that could deliver your packages straight to your door in the future.



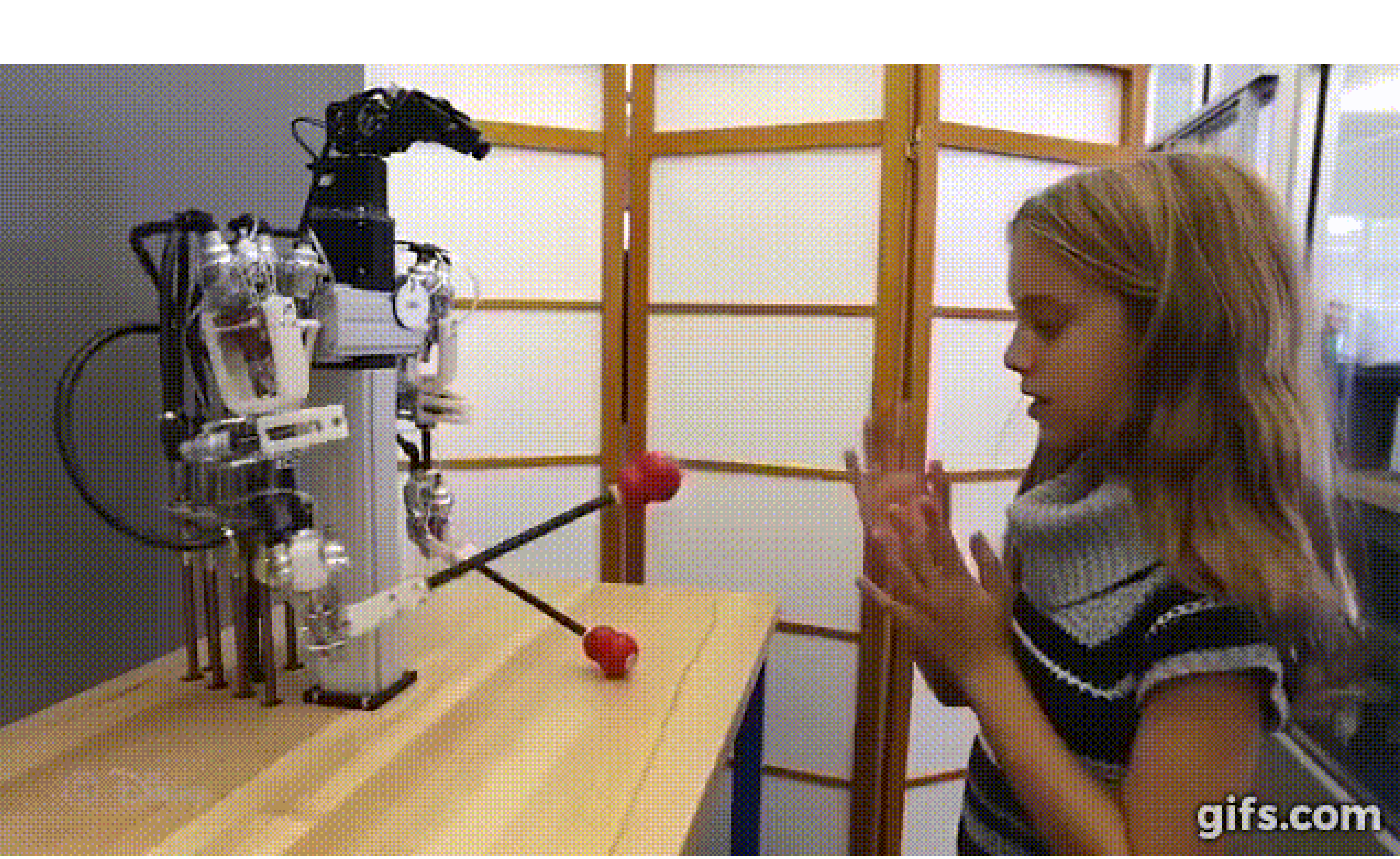
Ford claims this robot can carry packages up to 40 pounds, navigate stairs, and go around unexpected obstacles.



https://www.youtube.com/watch?v=U8Iey_wfo0I
3 minutes

This is a device developed at the Walt Disney company, to demonstrate new ways to move and power the various parts.

Its fun for kids to interact with it.



KITCHEN ROBOT



3) DISASTER RESPONSE

These robots perform dangerous jobs like searching for survivors in the aftermath of an emergency.

For example, after an earthquake and tsunami struck Japan in 2011, Packbots were used to inspect damage at the Fukushima Daiichi nuclear power station.

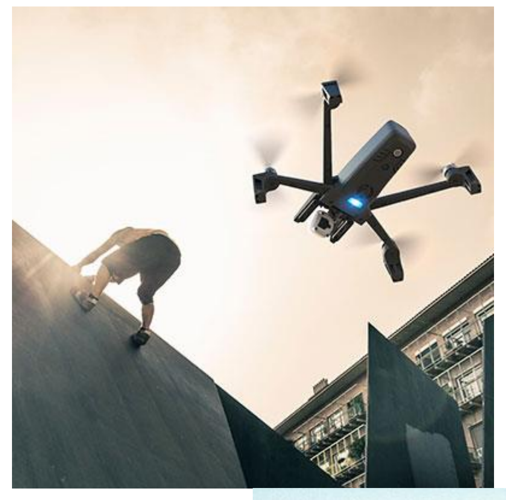




4) DRONES



Also called unmanned aerial vehicles, drones come in different sizes and have different levels of autonomy.



Examples include DJI’s popular Phantom series and Parrot’s Anafi.

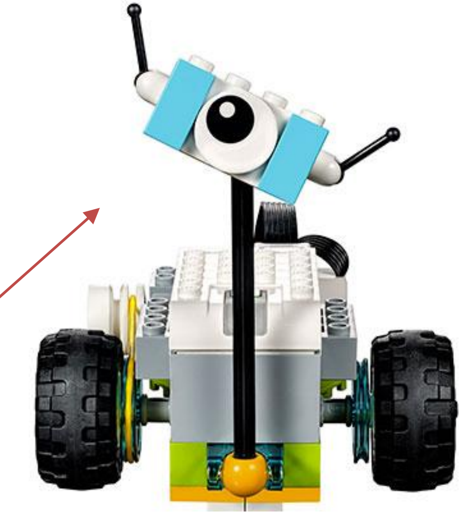
Military systems like Global Hawk are used for long-duration surveillance.



https://www.youtube.com/watch?v=NEW4aXuAEy0&feature=emb_logo .8 minute

5) EDUCATIONAL

This broad category is aimed at the next generation of roboticists, for use at home or in classrooms.

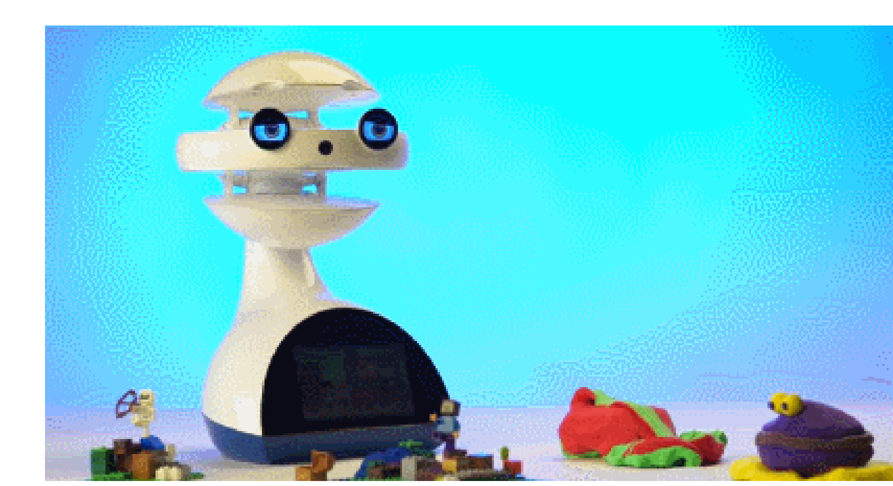


It includes hands-on programmable sets from Lego



3D printers with lesson plans

Teacher robots like EMYS who can teach children English as a second language.



https://emys.co/images/videos/kickstarter-2.mp4

[illegible] minutes

ROBOTS 4 AUTISM

Their new Avatar software allows teachers to deliver evidence-based, research-driven, Social and Emotional Learning (SEL) Education curriculum and content to students, regardless of location.

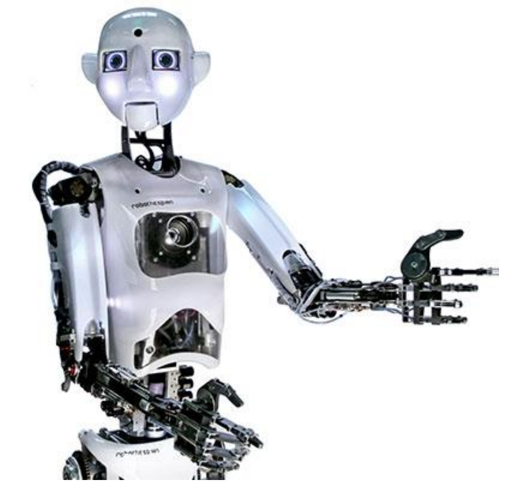
The program contains 13 modules and 110+ lessons designed to help Pre-K to 12 students understand emotions and master social and behavioral practices.



CARVER, ROBON, AND MILO



6) ENTERTAINMENT



These robots are designed to evoke an emotional response and make us laugh or feel surprise or in awe.



Among them are robot comedian RoboThespian

Disney's theme park robots like Navi Shaman

Musically inclined bots like the Toyota Partner.



Toyota Motor Corporation partner robots play instruments at the company's showroom in Tokyo.



NAO is a 23 inches tall humanoid robot. He is small, cute and round. You can't help but love him! NAO is intended to be a friendly companion around the house. **He moves, recognizes you, hears you and even talks to you!**

Aldebaran created NAO to be a **true daily companion**. He is the little creature who helps you be your best. Currently, it costs $6,500 which will hopefully go down soon.

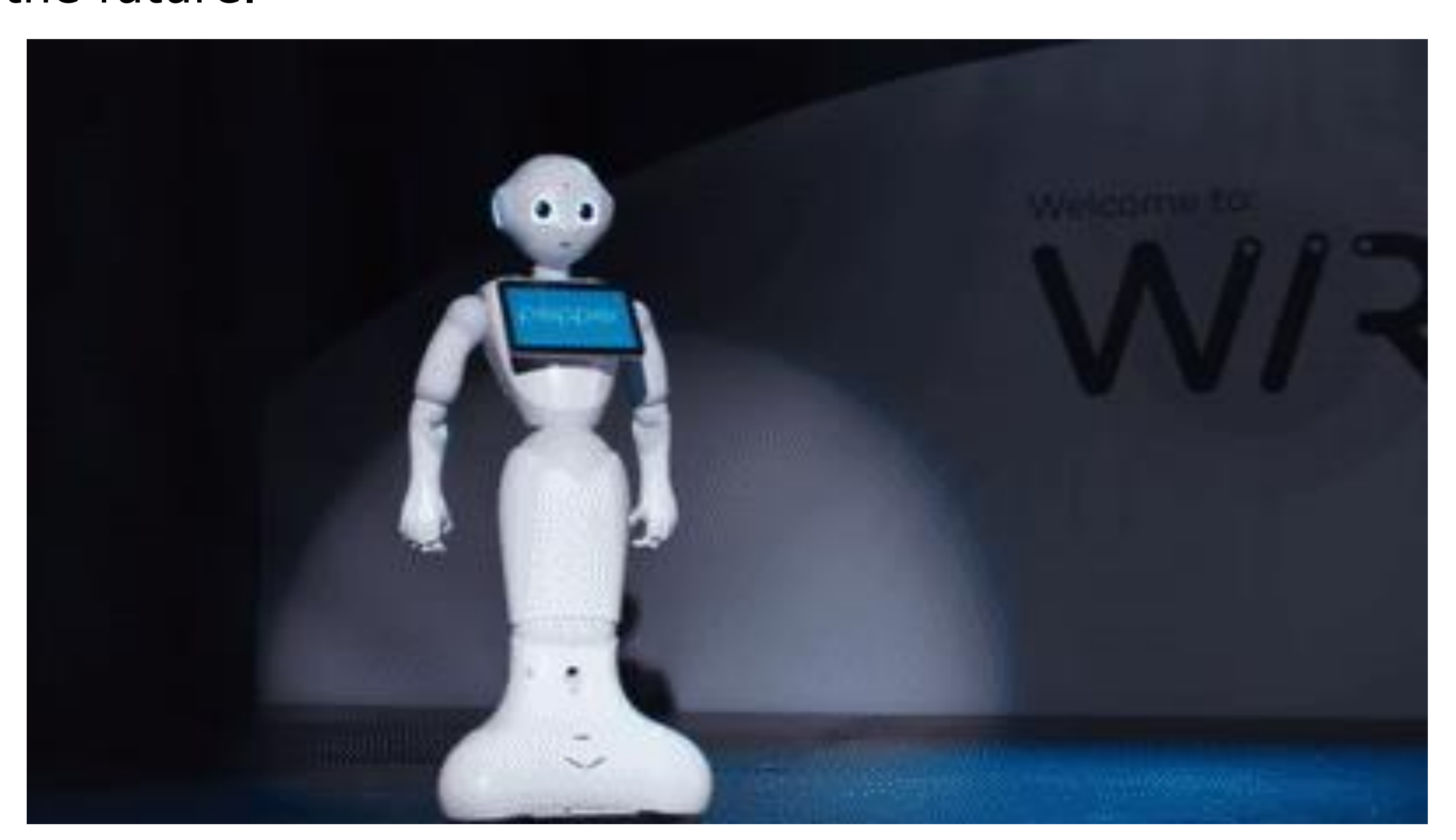


WHO IS PEPPER?

The latest creation from Aldebaran, **Pepper is the first humanoid robot designed to live with humans**.

Pepper is a social robot able to converse with you, recognize and react to your emotions, move and live autonomously.

It costs around $1,930.00 and hopefully, the prices should be coming down in the future.



Robotic baby seals named **"Paro"** are recharged at robot exhibition Robo Japan.

The $3,480.00 **Paro**, a cooing baby harp seal robot fitted with sensors beneath its fur and whiskers, is developed by Japan's Intelligent System Co, to soothe patients in hospitals and nursing homes



ROBOTIC CATS AND DOGS FOR THE ELDERLY

The Hasbro toy company introduced a line of robotic cats specially-designed for the elderly.



Its nice that they don't require litter boxes or trips to the vet. They respond to touch and motion like a living cat.

Tombot is a super-realistic dog robot that's meant for companionship with the elderly and people with dementia.



https://www.youtube.com/watch?v=JIC9zueFs80&feature=emb_logo 1 minute

ABRAHAM LINCOLN MECHATRONIC “ROBOT” AT DISNEYLAND PARK IN FLORIDA. HE HAS GREAT FACIAL EXPRESSIONS AND CAN TALK TOO !!



7) EXOSKELETONS

Robotic exoskeletons can be used for physical rehabilitation and for enabling a paralyzed patient walk again.

Some have industrial or military applications, by giving the wearer added mobility, endurance, or capacity to carry heavy loads.












https://www.youtube.com/watch?v=QjRrnwiP-8E
.8 minute

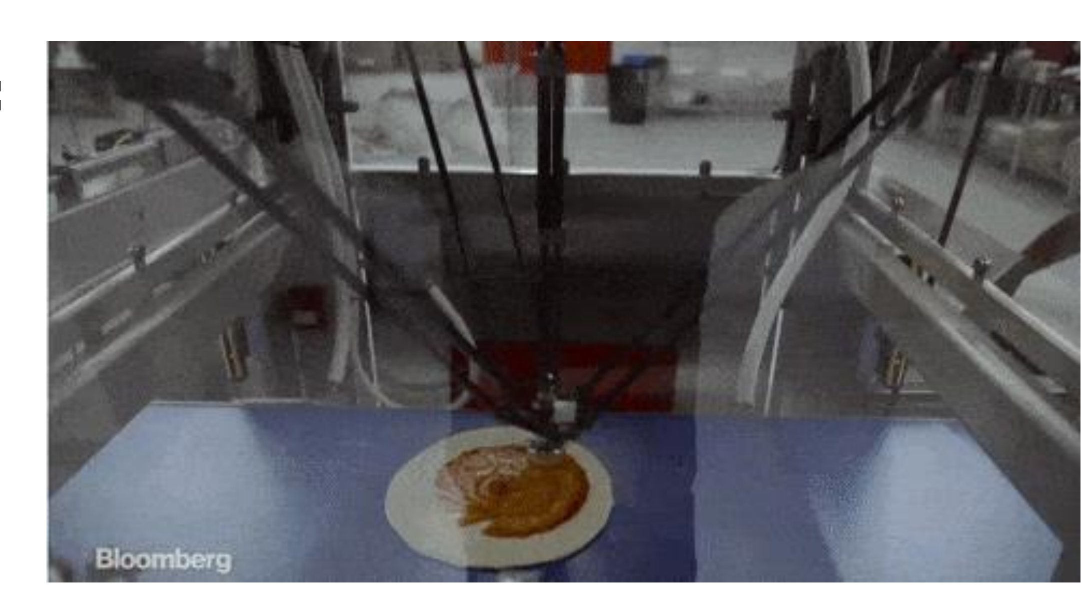
ReWalk" by ReWalk Robotics is a mobile lower body exoskeleton for walking assist and/or walking rehabilitation, and potentially a replacement to the wheelchair.

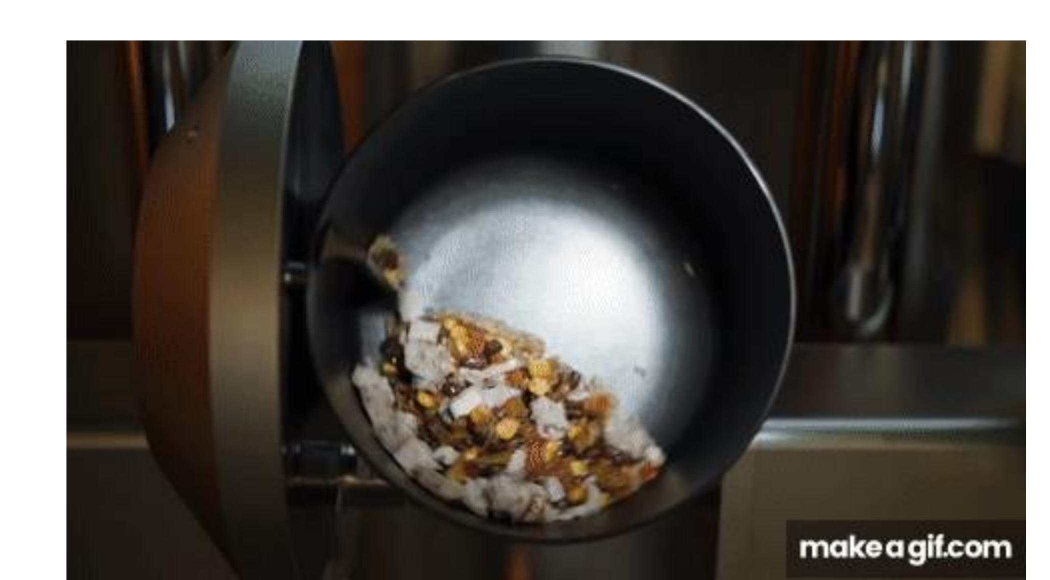


8) FOOD PREPARATION

Robots are used to make:

- Omelets
- Hamburgers
- Ice cream cones
- Coffee and Tea
- "Bowled" meals like stir-fry
- Smoothies
- Bread
- Pizza
- Grocery delivery

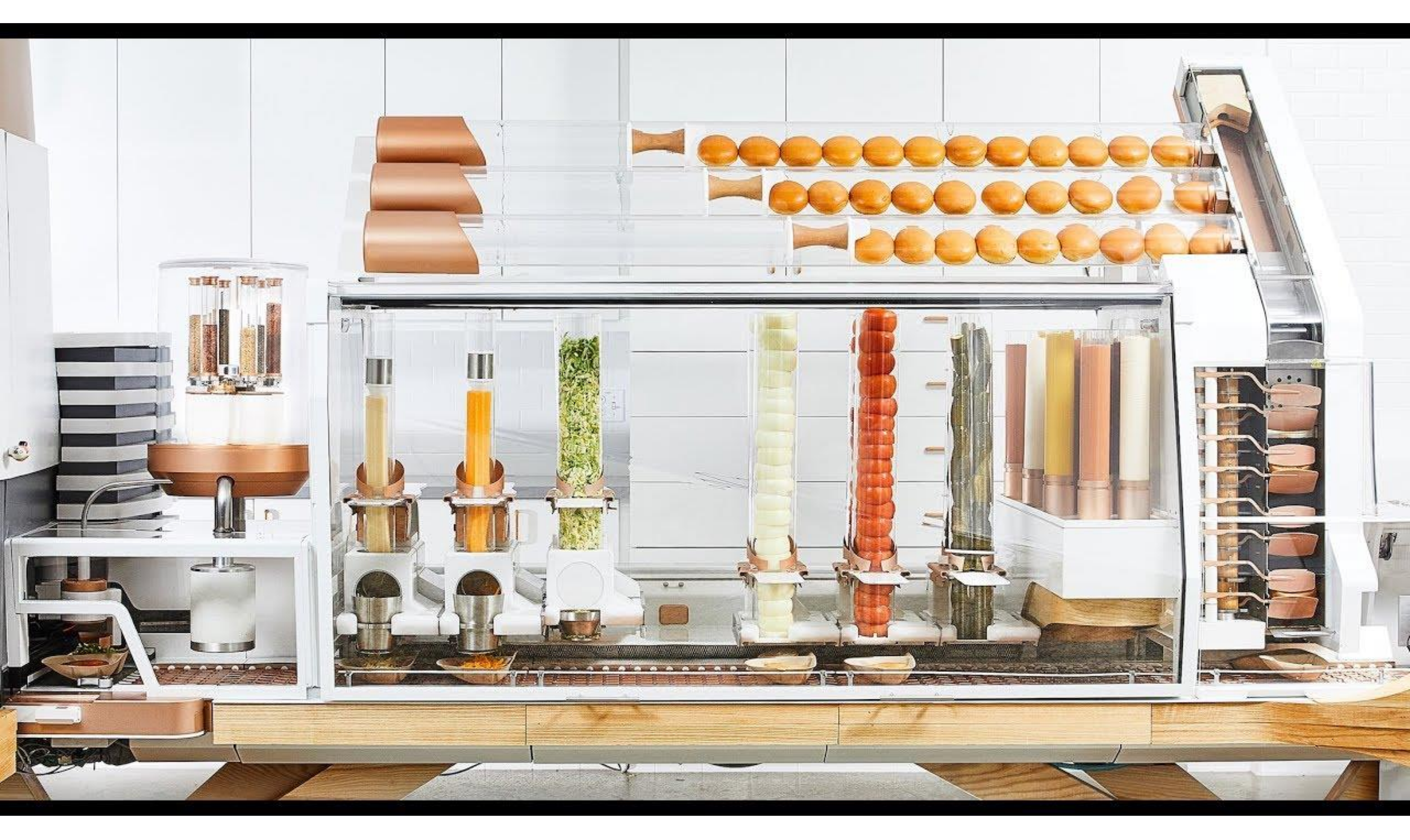




Fair visitors look at the humanoid robotic system "Rollin' Justin" preparing a tea at the world's biggest high-tech fair CeBIT in Hanover, central Germany.



A "ROBOT" MACHINE IS MAKING EXCELLENT BURGERS WITH YOUR CHOICE OF CHEEZE AND CONDIMENTS, IN SAN FRANCISCO !!



https://www.youtube.com/watch?v=y0_7NrrV8T4 1.3 minutes

FOODLY

Robots are already capable of automating many tasks for food businesses.

Foodly happens to be a humanoid robot capable of packing lunch boxes.

It has two arms to pick up fried food and put it in the box.

It has food safe end-effectors to get the job done.



FRESHIPPO RESTAURANT IN JAPAN

This Freshippo supermarket, formerly known as Hema, offers a highly automated, Jetson-like food experience.



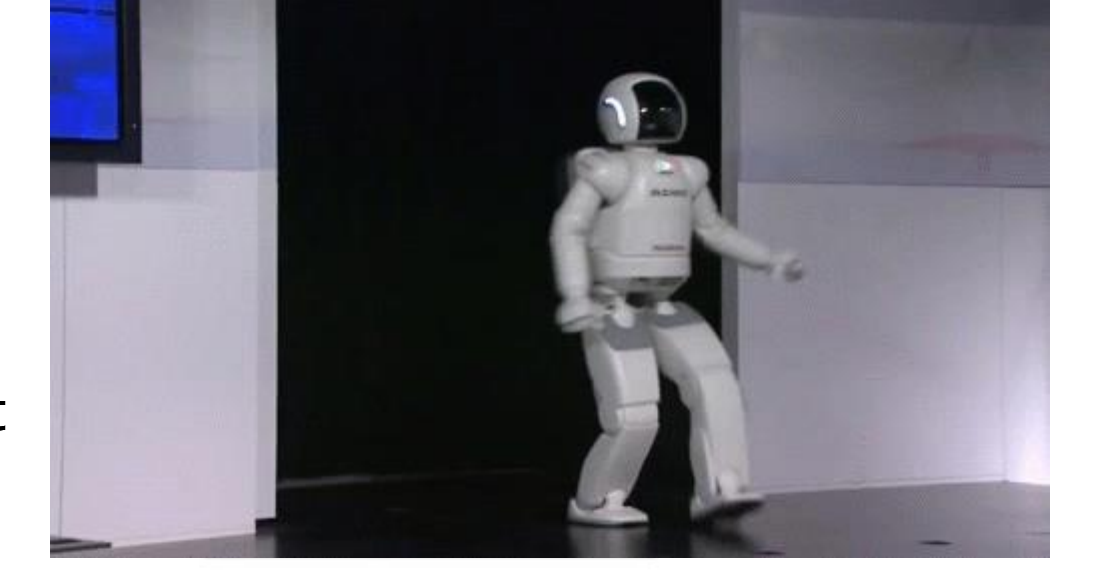
https://www.youtube.com/watch?v=fcqGnZqQJCQ 2 minutes

9) HUMANOIDS

This is probably the type of robot that most people think of when they think of a robot.

Examples of humanoid robots include Honda's Asimo, which has a mechanical appearance.

Androids like the Geminoid series, which are designed to look like people.





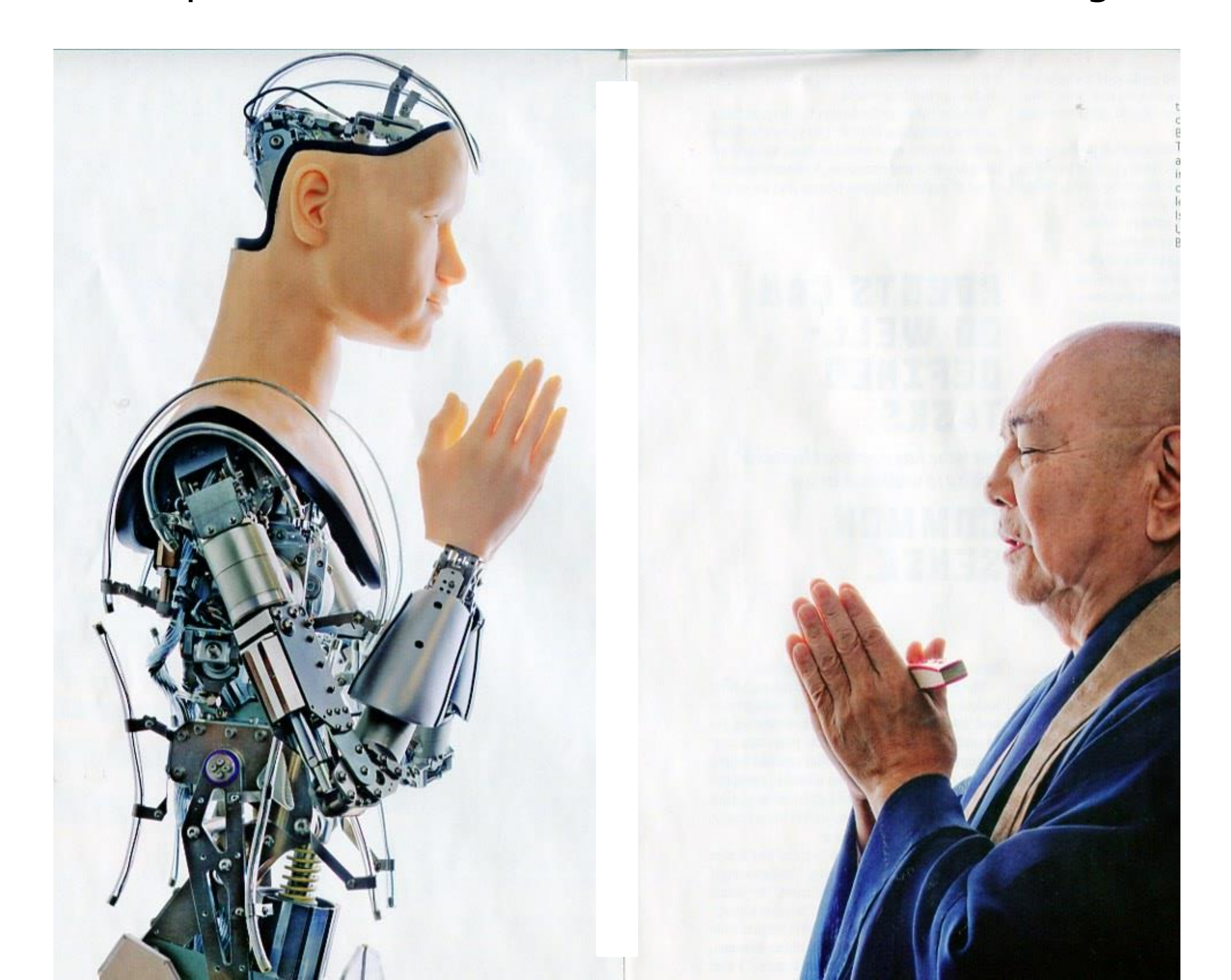


Want to go a step higher and employ a robot to serve tea instead of a pageboy, then get yourself **Asimo**, the walking, childlike robot from Honda Motor Co.

https://www.youtube.com/watch?v=ZhowMT9nfj0 1.3 minutes



Mindar, a robotic incarnation of Kannon, the deity of Mercy and Compassion in Japanese Buddhism faces Tensho Goto, a monk at a Japanese temple. The robot can recite Buddhist teachings.



10) INDUSTRIAL



The traditional industrial robot consists of a manipulator arm designed to perform repetitive tasks.

An example is the Unimate, the grandfather of all factory robots.



This category includes also systems like Amazon's warehouse robots

Factory robots that can do welding in closed areas or operate with human workers on an assembly line.



BETTYBOT WAREHOUSE ROBOT MOVES ITEMS EFFICIENTLY AT AMAZON !!

https://www.youtube.com/watch?v=8gy5tYVR-28   3.3 minutes



INDUSTRIAL APPLICATIONS

1) Arc Welding

2. Spot Welding

3. Materials Handling

4. Machine Tending

5. Painting

6. Picking, Packing and Palletizing

7. Assembly

8. Mechanical Cutting, Grinding, Deburring and Polishing

9. Gluing, Adhesive Sealing and Spraying Materials

10. Other Processes - inspection, waterjet cutting and soldering

https://www.youtube.com/watch?v=lR7c2rEFOH0 2 minutes

FIXTURING AND WELDING



11) MEDICAL AND REHAB

Medical and health-care robots include systems such as the **da Vinci surgical robot** and bionic prostheses



TYPES OF MEDICAL AND HEALTHCARE ROBOTS

- Surgical robots
- Rehabilitation robots
- Bio-robots
- Telepresence robots
- Pharmacy automation
- Disinfection robots

OPERATION ALERT !!

The next slide shows how well the Da Vinci robot works on a special medical procedure ! 😊

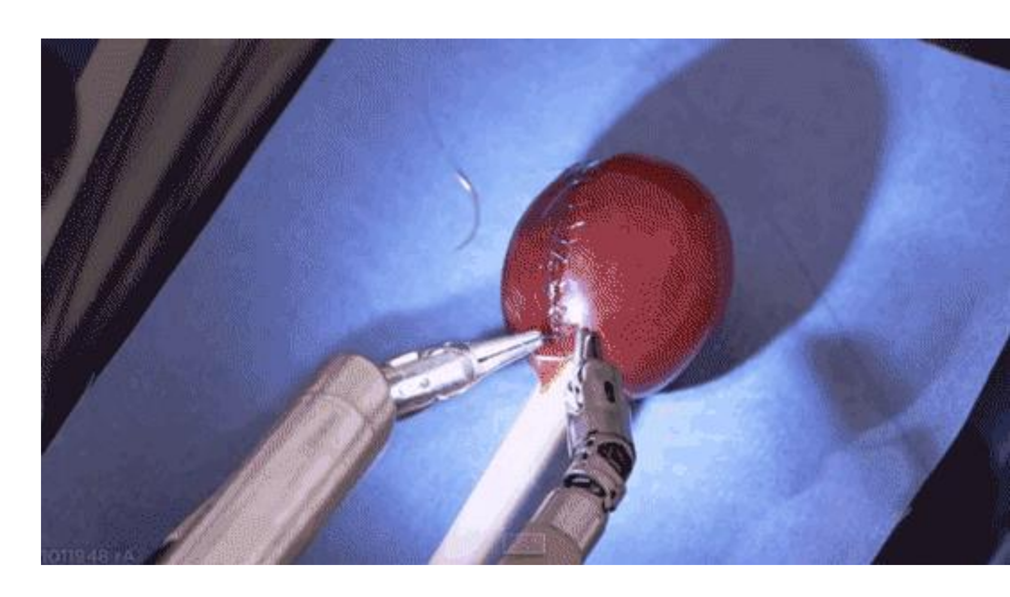
Da Vinci Si HD Surgical System

It does minimally invasive surgeries through superior visualization, enhanced dexterity, greater precision, and ergonomic comfort.

With small incisions of only 1 or 2 centimeters, surgeons can perform even complex procedures such as open-heart surgery.

The system reduces hospital stays by half, reducing costs by about one-third, because of less pain and speedier recovery, according to the company





https://www.youtube.com/watch?v=rI5CZLJRtU0

1.5 minutes



ROBOT NURSE BEAR - ROBEAR

https://www.youtube.com/watch?v=dCfW3UO6O0w 1 min

STERILIZING ROOMS WITH ULTRA-VIOLET LIGHT

UVD Robots was the first seller of autonomous disinfection robots back in 2014.

UV-C light can kill 99.99 percent of viruses and bacteria on any given surface, including the Corona virus !

They can disinfect a whole room in as little as 10 minutes and 20 minutes in an operating room!!

This year they have seen an increase in demand by almost 1,200 percent.

Hotel chains, office buildings, and warehouses are looking to use them for the same reasons.

The Kenex ultraviolet producing robot is used everywhere.





BIOROBOTS

A group of robots designed to imitate the thinking and anatomy of humans and animals to help with the training of **new dentists.**



HAL THE BOY MEDICAL TRAINING ROBOT

No longer must doctors and nurses train on lifeless mannequins.

Hal can shed tears, bleed, and urinate.

If you shine a light in his eyes, his pupils shrink.

You can wirelessly control him to go into anaphylactic shock or cardiac arrest.

You can hook him up to real hospital machines, and even jolt him with a defibrillator.

He only costs $48,000 !!



MOBILE HOSPITAL ROBOTS

You may never think about it, but transporting supplies, meals and other materials around the hospital is a drag on efficiency.

Enter **TUG, an autonomous mobile robot developed by Aethon Inc**. to ferry supplies to where they are needed, freeing employees from heavy physical loads and allowing them to focus on patient care.



https://www.youtube.com/watch?v=MLZMAW9lqXE 1.7 minutes

Kathy Hutchinson has been paralyzed from her neck down, for many years. Here, she controls a robot arm with her brain to move a bottle of coffee to her mouth.



https://www.youtube.com/watch?v=D6CCpfE2NoQ 3.5 minutes

SPOT QUADRUPED ROBOT

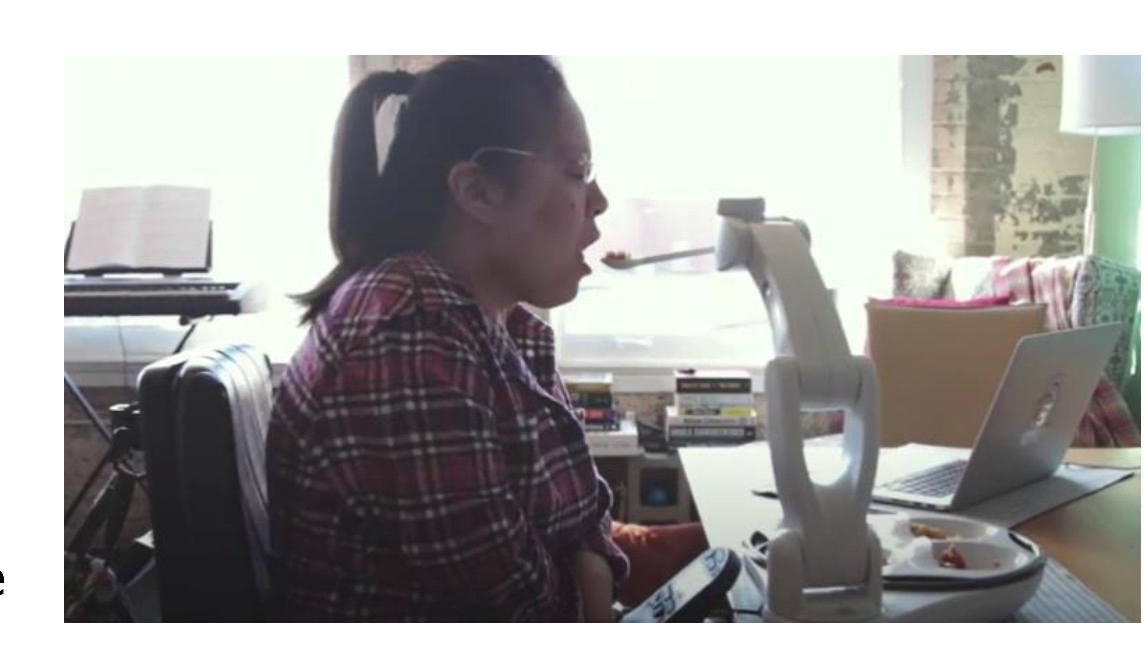
It is made by the Boston Dynamics Co. and is used to measure patients' vital signs remotely.

The robot uses four cameras to measure skin temperature, breathing rate, pulse rate, and blood oxygen saturation at a distance of 6.6 feet.

The doctor can control the robot via a tablet, and the robot's mounted tablet allows for conversations with the patient.



OBI - THE FEEDING ROBOT



It is a first of its kind, revolutionary dining device for individuals who lack upper extremity function.

Obi increases independence, social interaction, and effective food capture like never before.

With the momentary touch of a switch, Obi allows users to select between four compartments of food and command when the food is captured and delivered to the mouth.



https://www.youtube.com/watch?v=wancA0DNcF4&feature=emb_logo
.7 minute

MEAL BUDDY

It is the world's first 4 Axis Robotic Assisitve Feeder.

The product was designed specifically for people people living with disabilities.

https://www.youtube.com/watch?app=desktop&v=CGjMd-o9S3o 1.5 minutes



THE CARE MEAL SYSTEM



ABB LABORATORY ROBOT - Product development company Semcon says it is providing faster analysis of samples for an international laboratory company thanks to a collaborative robot from ABB.

It frees up time for laboratory personnel so that they can focus on more advanced tasks.

At the same time, this work requires a high level of precision so that no samples are contaminated.



12) MILITARY & SECURITY





Military robots include ground systems like Endeavor Robotics' PackBot, used in Iraq and Afghanistan to scout for improvised explosive devices

BigDog is designed to assist troops in carrying heavy gear.

Security robots include autonomous mobile systems such as **Cobalt**.



A **Navy Talon 3B robot** approaches a claymore land mine on a sand dune during a training exercise at a training range in Djibouti, Africa.

Navy Explosive Ordnance Disposal technicians from Mobile Unit 4 operate the robot from safe locations through the use of monitors and video equipment attached to the robot.



KNIGHTSCOPE AUTONOMOUS SECURITY ROBOTS.

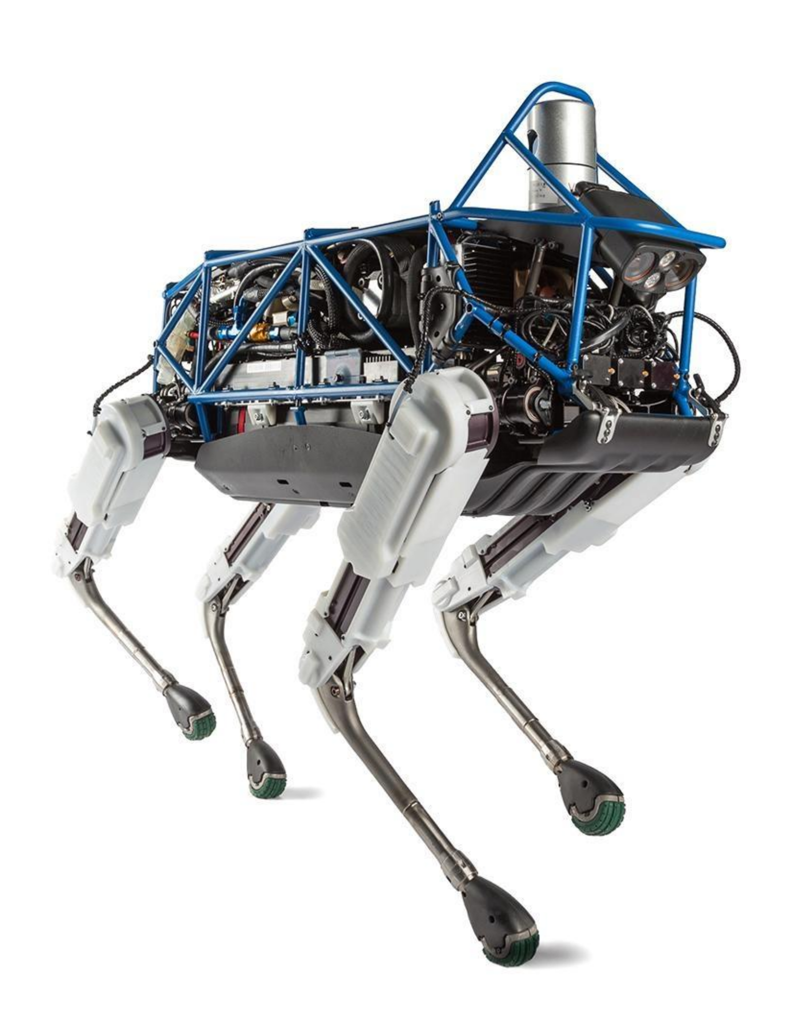
Costs for these systems is typically about half the cost of what a human security officer costs; and they don't sleep.

These robots can be deployed in stationary locations (ingress/egress points), indoors, or outdoors.

They can function fully autonomously and be monitored in real time



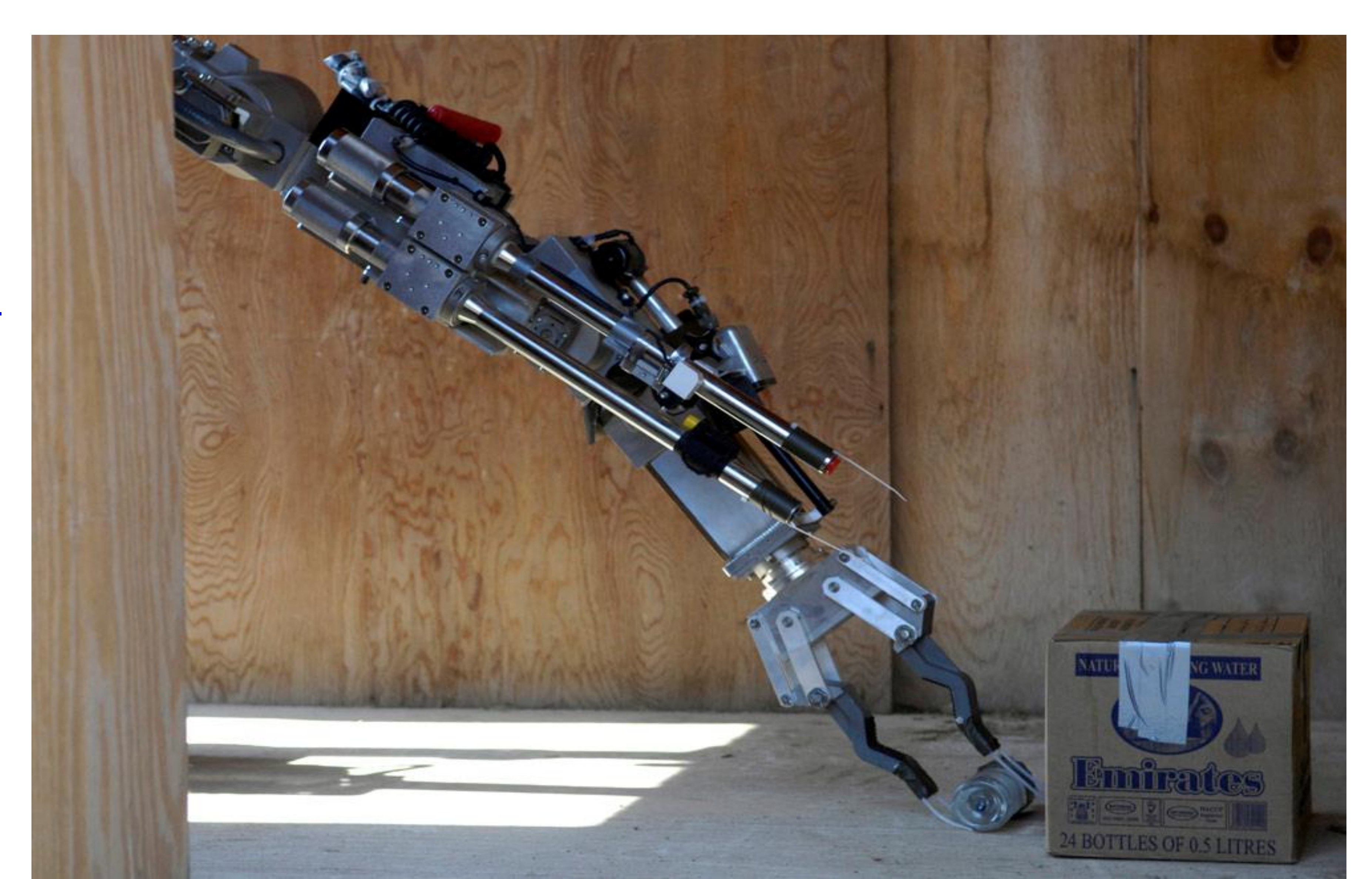
INTRODUCING “SPOT” AND “SPOT MINI”, THE AMAZING MECHANICAL ROBO DOGS DESIGNED BY THE BOSTON DYNAMICS CO.



https://www.youtube.com/watch?v=G-vVIS4xVrU 3 MINUTES

An Explosive Ordinance Disposal robot places an explosive device next to a suspicious package during a demonstration.

6



13) RESEARCH



The vast majority of today’s robots are born in universities and corporate research labs.



Though these robots may be able to do useful things, they’re primarily intended to help researchers do, well, research.

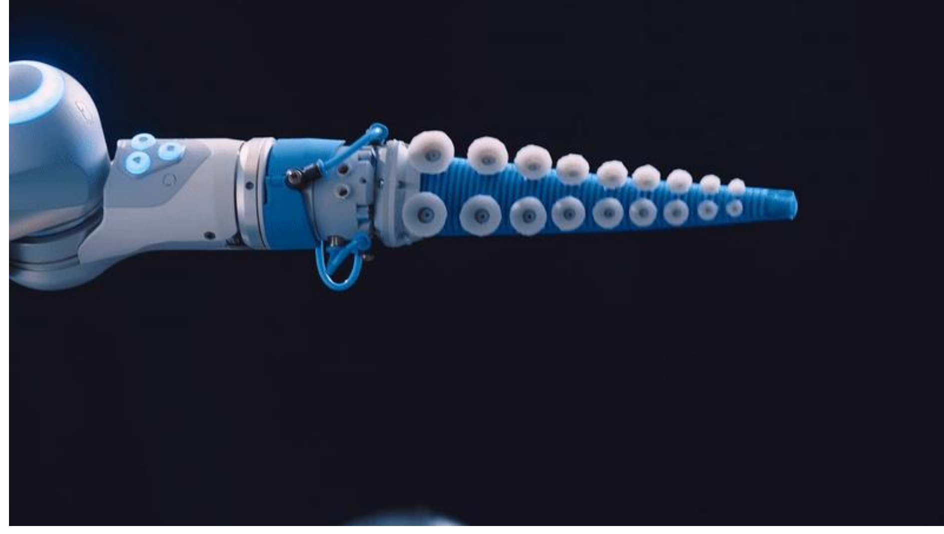


So although some robots may fit other categories described here, they can also be called research robots.

The Festo company is a manufacturer of very high quality wood and metal working tools.

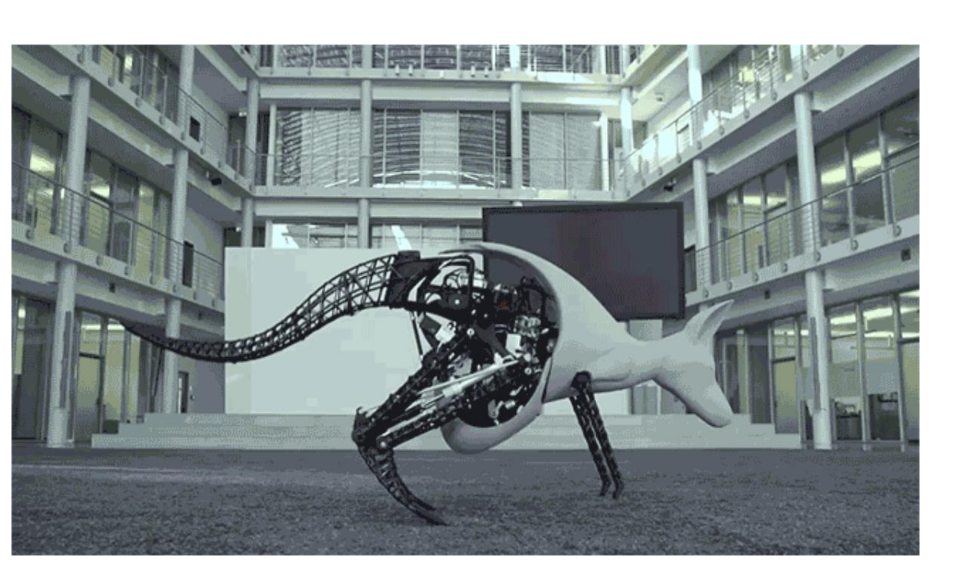
They are also very interested in different types of robots, based on Nature – animals, fish, dragonflies, octopi, and more.

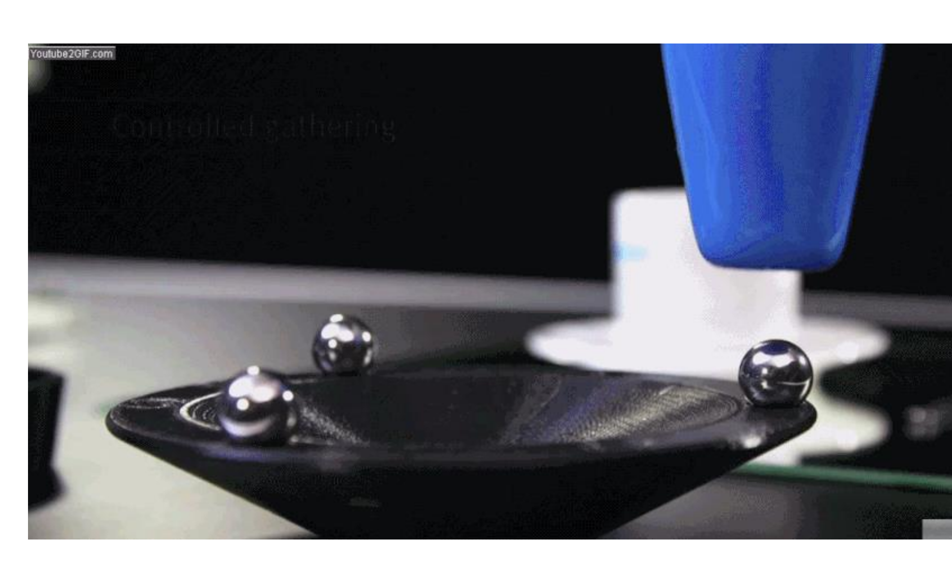












https://www.youtube.com/watch?v=_qRGIRvr06w 1.7 minutes

14) SELF-DRIVING CARS



Many robots can drive themselves around, and an increasing number of them can now drive you around.

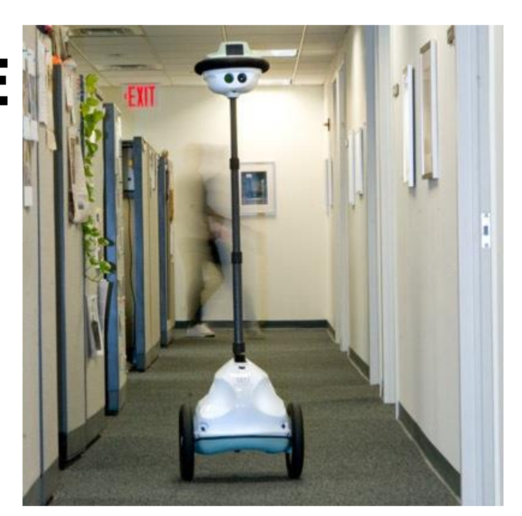


Early autonomous vehicles include the ones built for DARPA's autonomous-vehicle competitions



Google's pioneering self-driving Toyota Prius, later spun out to form Waymo.

15) TELEPRESENCE



Telepresence robots allow you to be present at a place without actually going there.





You log on to a robot avatar via the internet and drive it around, seeing what it sees, and talking with people.



Workers can use it to collaborate with colleagues at a distant office, and doctors can use it to check on patients.

TELEPRESENCE ROBOTS

A telepresence robot helps place "you" at a remote location instantly, providing you a virtual presence, or "telepresence."

It is a computer, tablet, or smartphone-controlled robot which includes a video-camera, screen, speakers and microphones.

People can interact with the robot by viewing and hearing its operator





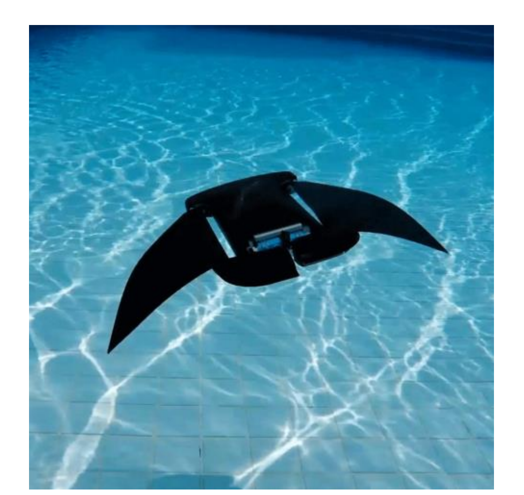




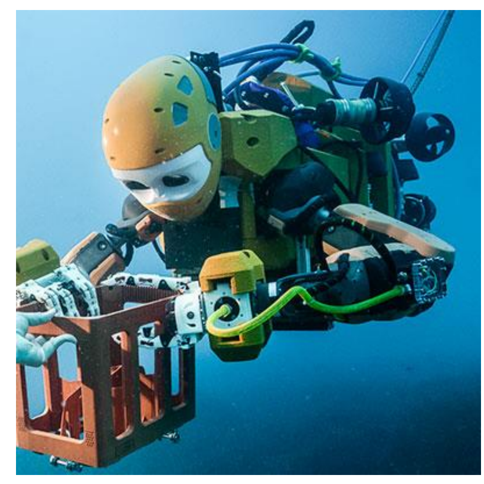
1 minute

https://www.youtube.com/watch?v=PDTGyg1i6cM&feature=emb_logo

16) UNDERWATER



The favorite place for these robots is in the water.



They consist of deep-sea submersibles like Aquanaut

Diving humanoids like Ocean One



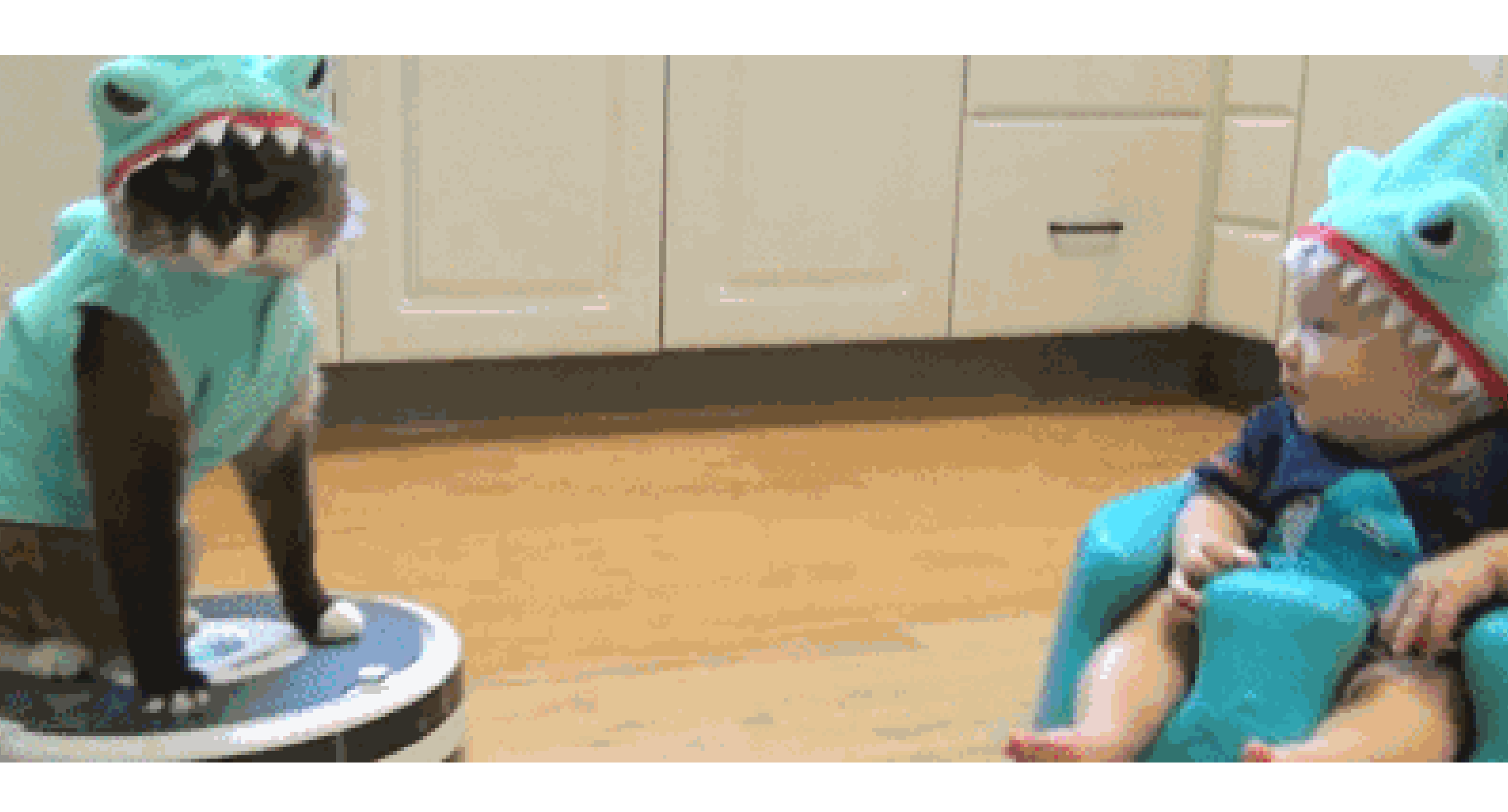
Bio-inspired systems like the ACM-R5H snakebot.

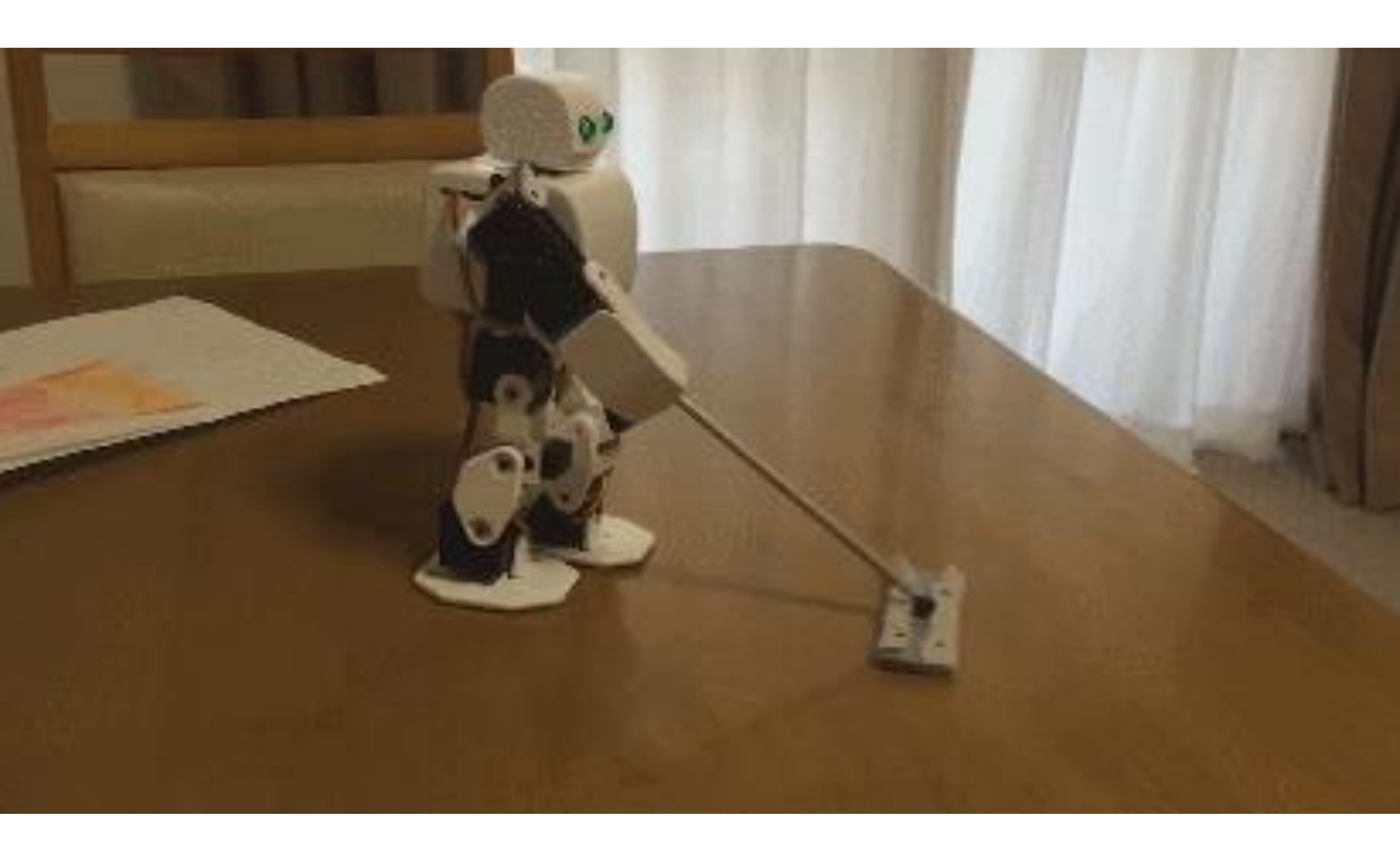
OOPS, HEY, WE ALMOST FORGOT THE HUMOR WITH ROBOTS !!




WD-40

CAT DRESSED AS A SHARK AND ON A ROOMBA, ENTERTAINS A BABY



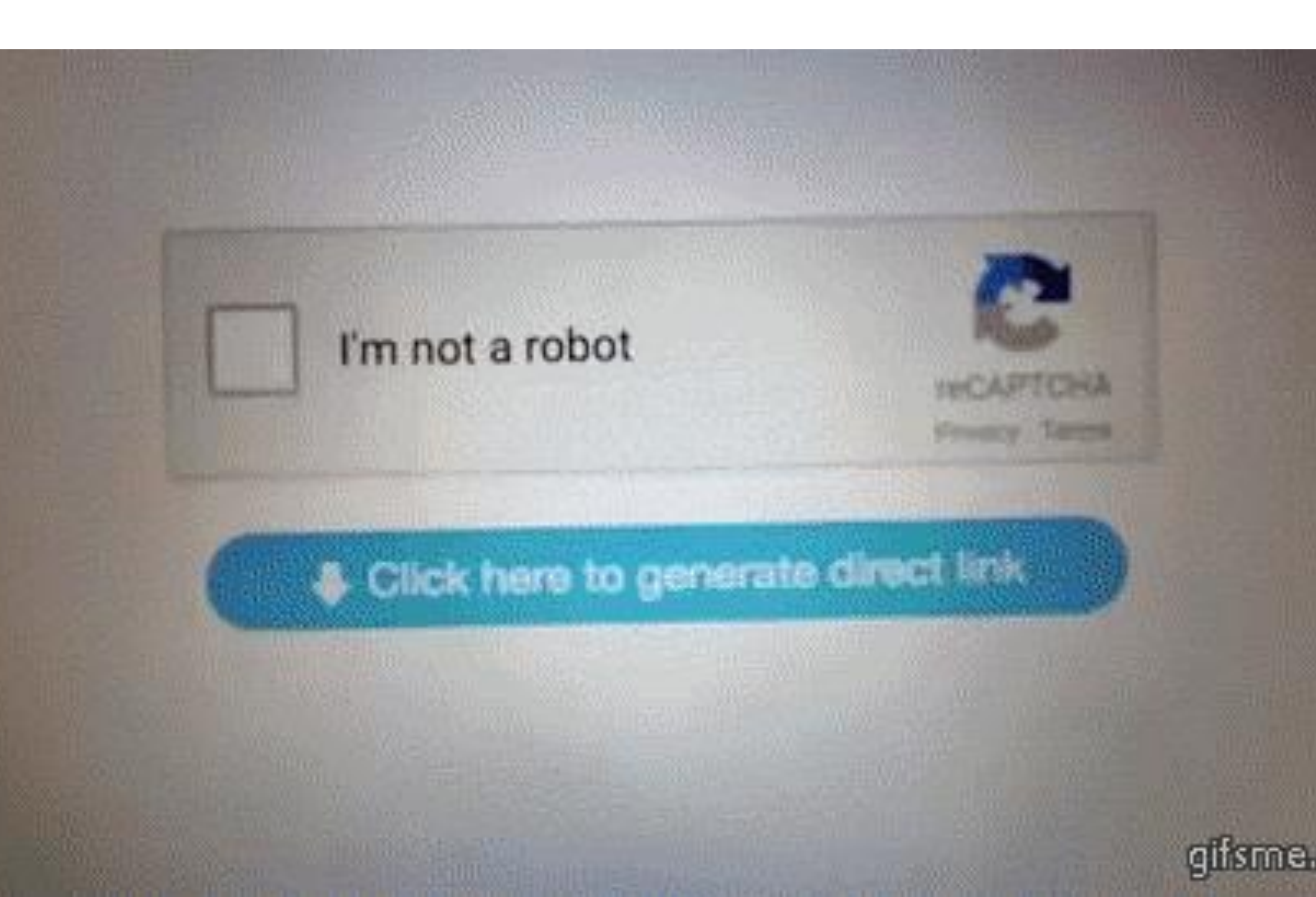


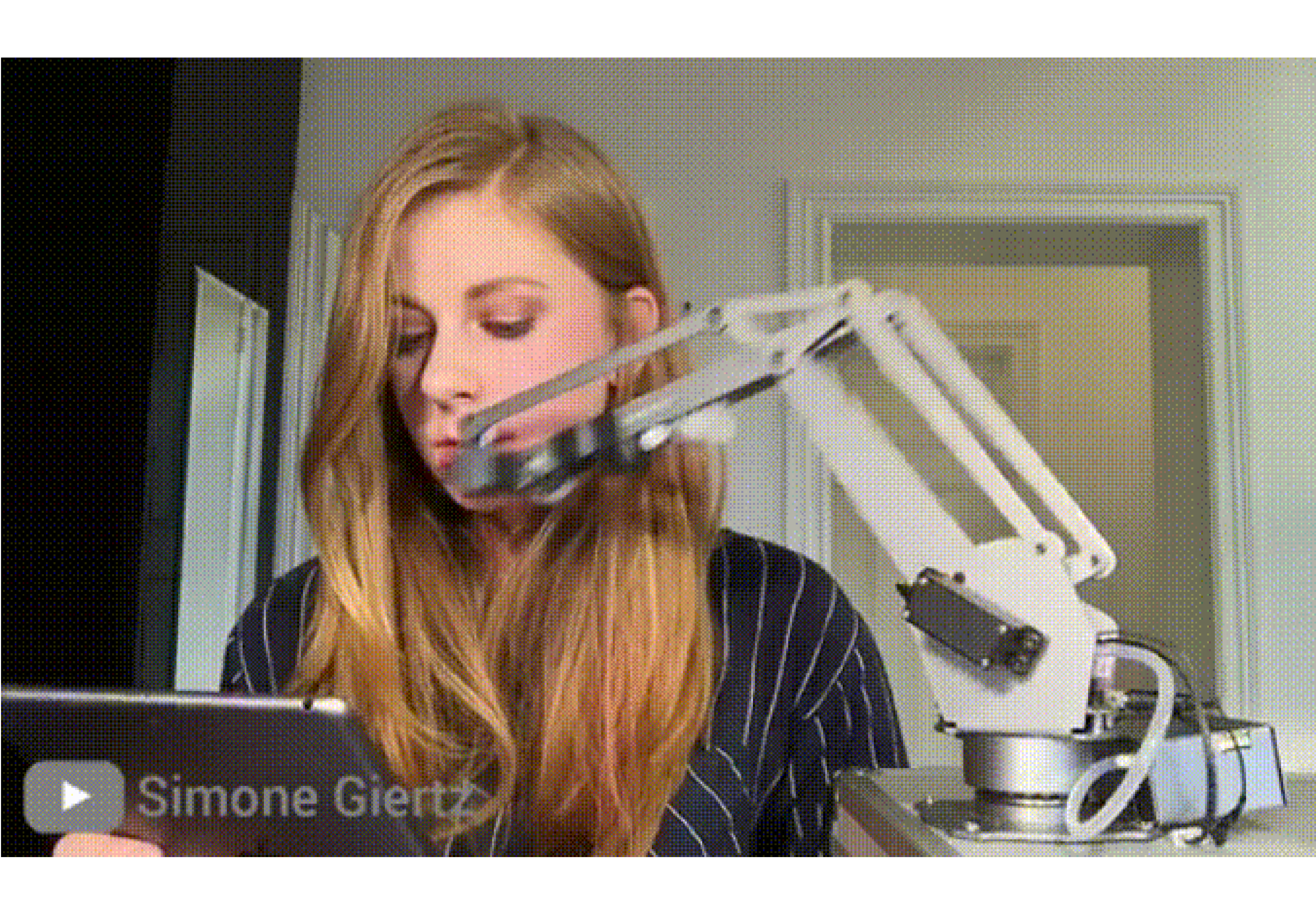


R2 - D2

So vulgar they beeped out every single word he said

THE FOLLOWING PAGES AND ROBOT DESIGNS ARE BY SIMONE GIERTZ



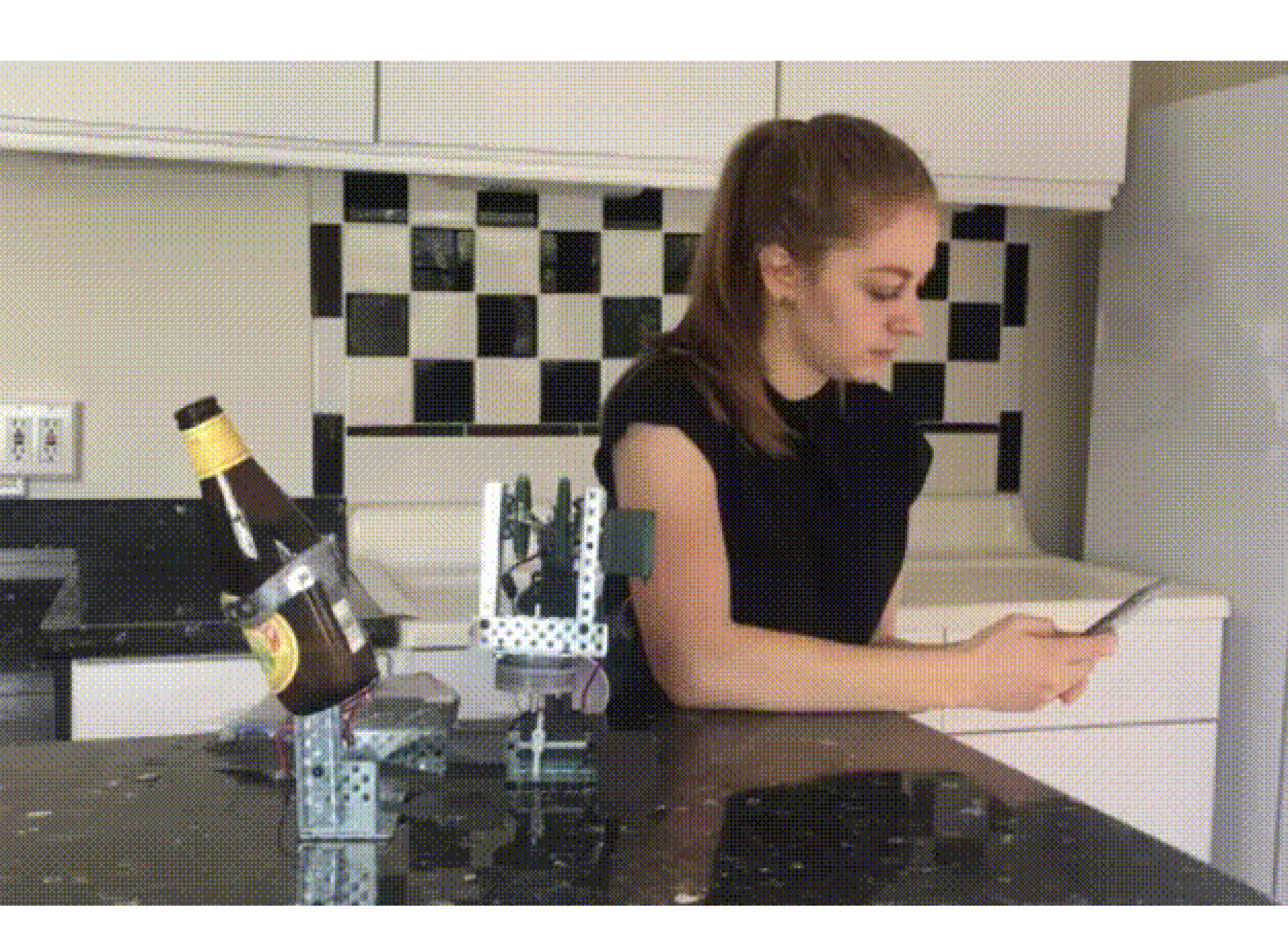

Simone Giertz




4GIFs.com

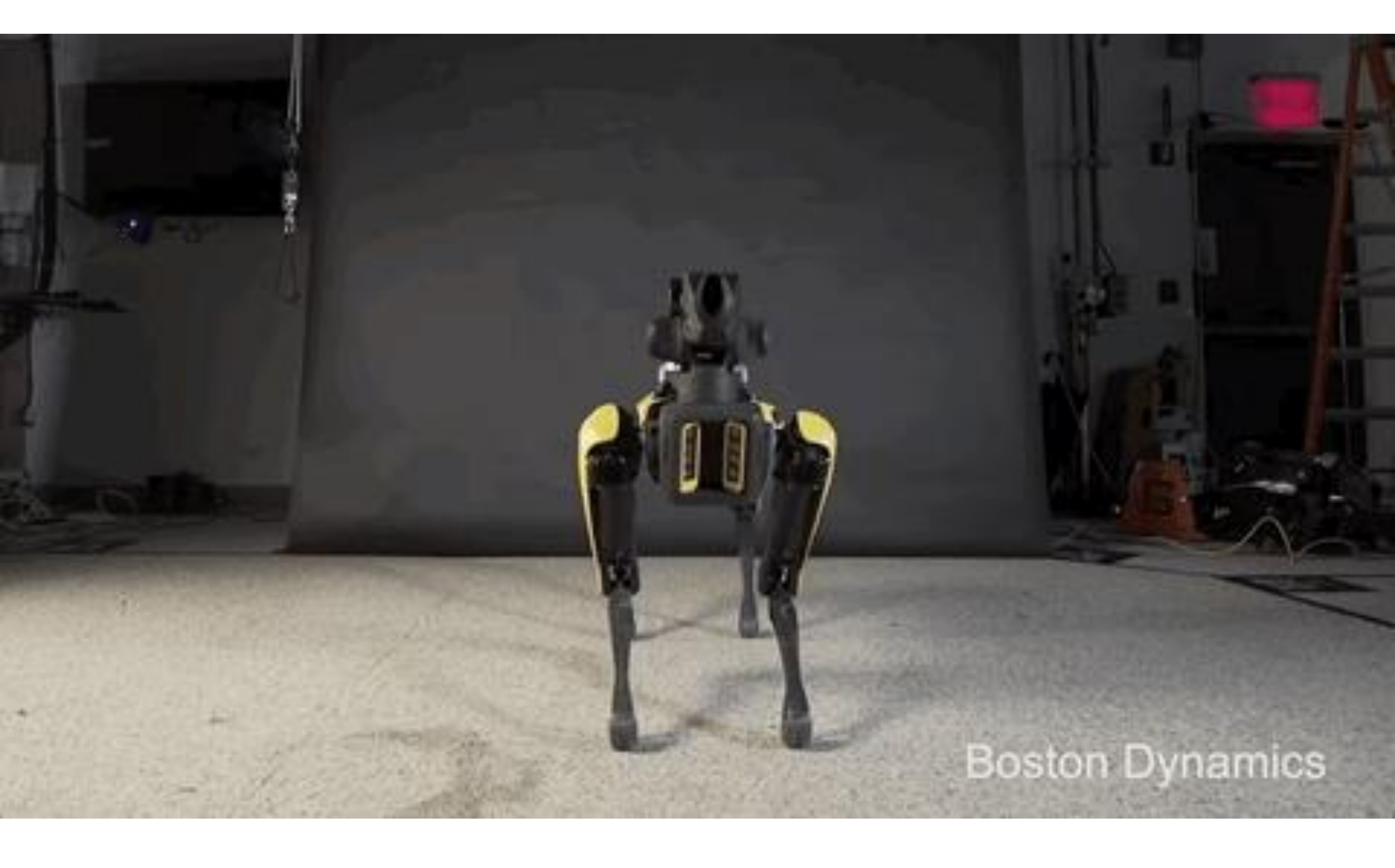







Cheerios
gifak.net

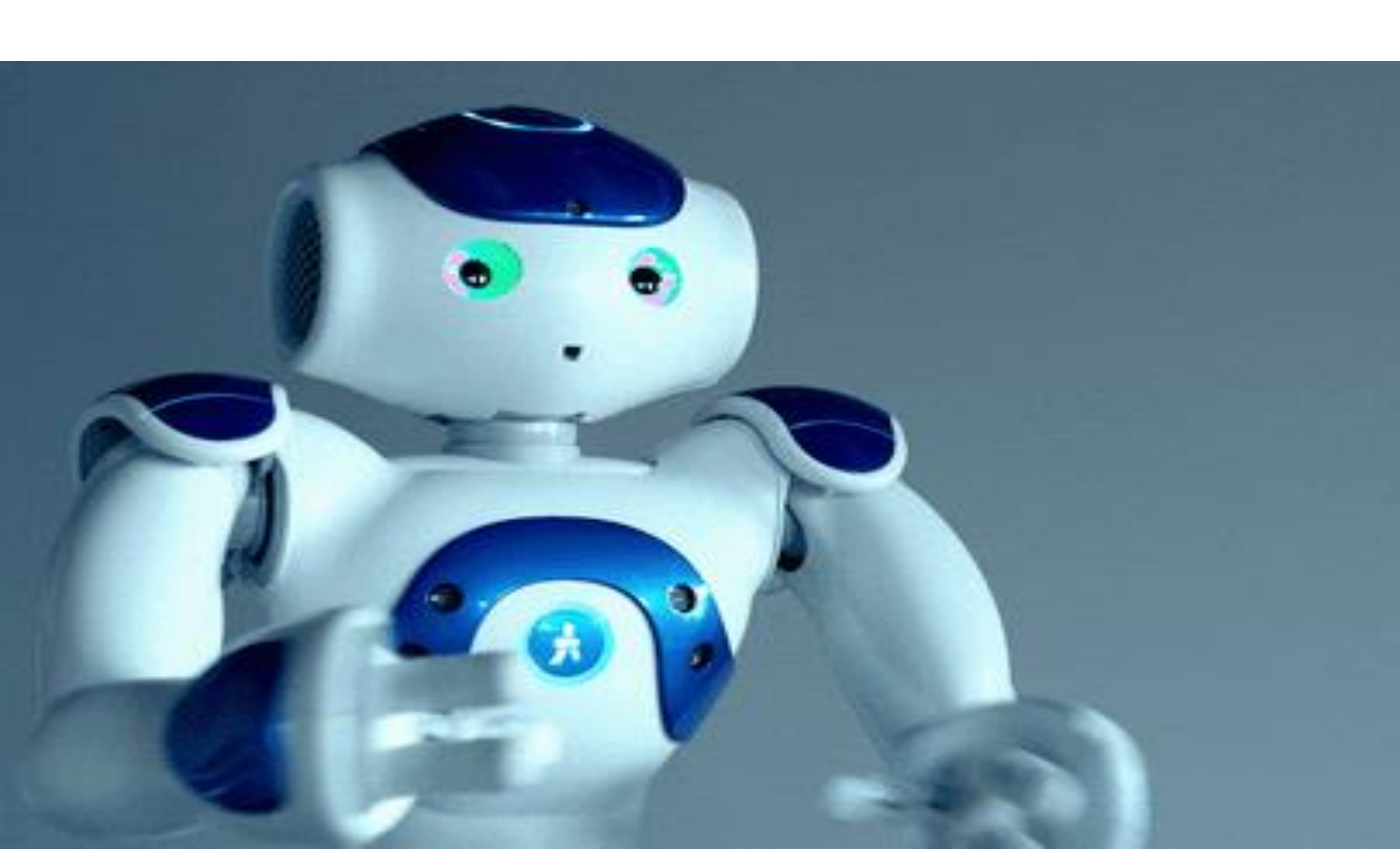
UPTOWN SPOT !!



https://www.youtube.com/watch?v=kHBcVlqpvZ8&t=2s



THANK YOU !!



BIBLIOGRAPHY

https://robots.ieee.org/learn/types-of-robots/

1.5 minute of a Disney robot toy device
https://www.youtube.com/watch?v=HY4bfnHMdtk&feature=emb_logo

2 minute good video about using pets in nursing homes for dementia patients https://www.youtube.com/watch?v=u0aPNuuOLKA&t=1s

Robotic bees for space uses
https://nasa.tumblr.com/post/183899080814/robotic-bees-are-about-to-join-astronauts-in

Great article with neat videos about sterilizing rooms in a hospital and more https://www.roboticsbusinessreview.com/robo-dev/6-experimental-uses-for-robotics-in-2019/